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25X1A

TID/TAB-107/65
5 November 1965

MEMORANDUM FOR: Assistant for Plans and Development Staff

THROUGH: Chief, Technical Intelligence Division

SUBJECT: Statement of Understanding on Procurment of Binary Data Reader

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1. Two meetings have been held recently between members of the [redacted] and personnel from NPIC (PDS/DB and TID/TAB) on the submission of a proposal to build a replacement for TAB's Binary Data Block Reader. At these meetings several suggestions were made by the TAB personnel towards making the new reader more efficient, reliable, and useful. These suggestions are listed below as a means of recording them for review when the Company's proposal is being studied by PDS. Suggestions relating to the existing design are:

not needed w/ proposed system

a. Provide separate sensitivity controls for each photocell, and switches to permit each cell to be turned either on or off reguardless of the data block input information. These switches will make it possible to overide known malfunctions of individual data block lights.

b. Provide a more convienient allignment proceedure that maintains dynameic tension on the film (e.g. a knob operated bi-directional proportional servo control) for aligning the data block image with the photocell pattern.

c. Install a postive clutch system on the film transport system.

d. Provide a speed control feedback loop that will maintain the film speed in synchronization with the data readout operation.

e. Use a card punch that punches the cards on parallel rather than one that punches in serial to speed up the punching cycle. This will permit the reading cycle to control the overall speed instead of the slower card punching cycle.

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f. Arrange the binary readout display lights so that they correspond to the data block pattern and, if possible, place this display so that it is easy to compare it with the data block image on the film.

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g. Use a frame counter that permits setting individual digits in each of its decades.

h. Install the capability of stopping the reading operation at a preselected frame number.

i. Use a more convienient type of dial switch for entering constant data, such as mission and pass numbers.

2. The above suggestions pertain to items that are present on the existing data block reader, in some form or another. In addition, TAB wishes to have some entirely new features incorporated. These features are:

a. A "machine side" read out (on hard copy) of the binary data converted to decimal notation. For each frame this read out hard copy should contain, the frame number, the raw binary read out, the decimal equivalent of the binary read out, and the differences (in decimal notation) between each frame reading and that for the preceeding frame.

b. A provision to stop the reading operation whenever the difference between the frame just read out and the preceeding reading exceeds a given set limit. It must be possible to adjust this limit, in decimal notation, between one and ten seconds. It also must be possible to by-pass this feature at will.

c. Capability to reverse wind the film a given number of frames under the control of an adjustable, pre-set counter.

3. Suggestions 2. a. and 2. b. above are very desirable as their inclusion will result in a much faster overall processing time for key information needed for determining mission data. At present it is necessary to send raw binary data (in card deck form) to the 490 Univac computer to obtain the preliminary listing needed for making corrections. These corrections are necessary because of malfunctions in the camera time recording system either turning lights on when they should be off, or the reverse. Of course this gives erroneous time values for such frames that can be corrected only by inspection of the readout. The same effect is also introduced if the binary reader itself missreads a data block or if the card punch faults. Experience has shown that the total number of

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these errors can be quite large for a single mission, at times totaling more than half of all of the readings. With the features suggested in 2. a. and 2. b. above, these corrections can be made at the time of readout, with the film in the machine. This would make the correction process much simpler as it saves returning to the machine (or hand reading) the data block to determine the correct reading, and then punching the correction card by hand. It also saves at least one 490 data processing run as well as the attendent hand punching of the preliminary correction cards. It is believed that with experience in the use of these features a "clean" deck of cards could be handed the computer for incorporation into the final ephemeris process without preliminary runs. Also, undoubtedly, the total time for final corrected listing can be shortened by several days, with preliminary lists available for work, immediately upon initial readout.

4. The suggestion given in 2. c. above would be a great convenience to the operator and would be nice to have. However, it should be included only if its inclusion does not greatly increase the cost, or extend the delivery date.

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Production Section
Technical Analysis Branch

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Oct 20, 1965

SUGGESTIONS FOR IMPROVEMENT

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A.) PHOTOCELL ARRANGEMENT

1.) Provide a separate sensitivity control on each photocell which will also permit it to be turned completely on or off.

B.) SERVO SYSTEM

1.) Provide a more convenient alignment procedure which maintains dynamic tension on the film. (e.g. a knob-operated bi-directional proportional servo control for aligning the binary dot pattern with the photocell pattern along the axis of film travel.)

2.) Install a more positive clutch system.

3.) Provide a speed control feedback loop which will keep the film in sync with the dot reading process.

C.) CARD PUNCH

1.) Use a card punch system (e.g. summary punch) which will increase the speed of the readout cycle and which will allow the dot reader rather than the card punch to control the cycle.

2.) Provide for increased operator comfort by eliminating the potential difference between the card punch and the dot reader.

D.) CONSOLE CONTROLS

1.) Change the pattern (and possibly location) of the console lights to allow it to be more easily compared with the film pattern.

2.) Install a frame counter whose digits can be set individually.

3.) Install a separate "stop counter" which will allow a preset frame number to stop the machine. (It should also

be possible to set the digits of this counter individually.

4.) Provide more comfortable constant dials whose arrangement conforms to the card format.

E.) GENERAL REMARKS

In addition to the above it is also desirable to consider the possibility of a different overall design which will result in increased viewing and operating comfort and which will permit easier and more positive alignment of the film with the photocells. (e.g. Projecting the image in a position where it can be more conveniently viewed by the operator; Increasing the size of the dot image.)

If considerations of cost and complexity permit, it would also be desirable to have sufficient logic circuitry to permit immediate binary to decimal conversion and computation of the delta time between successive frames.

It is also highly desirable that error circuitry be included in the design of the new machine and that its overall size be kept to a minimum.